

Problem of condensation (adhesion) of ...

32319  
S/020/61/141/005/013/018  
B101/B144

adsorbed atoms or molecules. The values of the function  $\bar{z}_{ch}(n_{ch})$  for the adsorption of  $H_2$  on W were calculated from Eq.(6) for different temperatures. Here,  $a_{ch} = kT/h$  ( $h$  = Planck's constant). In Fig. 1, these values are compared with the experimental data of Ref. 3. A qualitative agreement was found. For a quantitative comparison, the data for  $q_{ch}(n_{ch})$  are not yet available. A paper by N. D. Morgulis, A. G. Naumovets (Izv. AN SSSR, ser. fiz., 24, no. 6 (1960)) is mentioned. There are 1 figure and 10 references: 2 Soviet and 8 non-Soviet. The three most recent references to English-language publications read as follows: Ref. 1: J. A. Becker, C. Hartman, J. Phys. Chem., 57, 157 (1953); Ref. 2: G. Erlich, J. Phys. Chem., 60, 1388 (1956); Ref. 3: J. Eisinger, J. Chem. Phys., 27, 1206 (1957), *ibid.*, 28, 165 (1958); *ibid.*, 30, 412 (1959).

ASSOCIATION: Institut fiziki Akademii nauk USSR (Institute of Physics of the Academy of Sciences UkrSSR)

PRESENTED: June 26, 1961, by A. N. Frumkin, Academia

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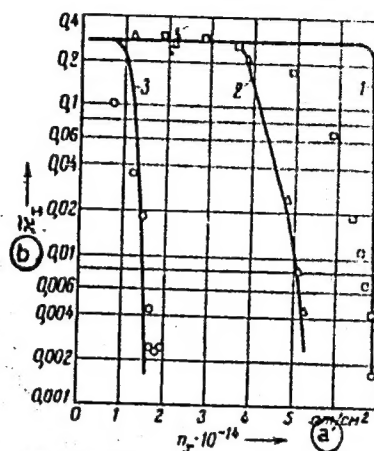
Problem of condensation (adhesion) of ...

S/020/61/141/005/013/018  
B101/B144

SUBMITTED: May 23, 1960

Fig. 1.  $\tilde{z}_{ch}(n_{ch})$  calculated from Eq.(6) and compared with data of Ref.3. (1) 310°K; (2) 610°K; (3) 740°K. Legend (a) atoms/cm<sup>2</sup>; (b)  $\tilde{z}_{ch}$ .

Fig. 1



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L0880

S/181/62/004/009/009/045  
B108/B18624.7400  
5.4400

26.1640

AUTHORS: Gavriluk, V. M., and Medvedev, V. K.

TITLE: Adsorption of barium atoms and carbon monoxide molecules on  
the (113) face of tungsten single crystals

PERIODICAL: Fizika tverdogo tela, v. 4, no. 9, 1962, 2372 - 2381

ABSTRACT: Adsorption of barium was studied by the method of the contact potential, using a device similar to that described in Yu. S. Vedula, V. M. Gavriluk, UFZh, 3, 632, 1958. The work function  $\phi$  as a function of the number  $n$  of adsorbed atoms is similar to the result in the aforementioned paper. Agreement with theory is satisfactory. This holds true also for the heat  $q$  of adsorption. The adsorption of CO was investigated using a vacuum apparatus as shown in Fig. 3. Three types of chemisorption of CO take place according to the accumulation of CO molecules on the surface of W. Each of these three types has its specific heat and degree of ionization of the molecules. Part of the molecules are reflected from the surface and only a fraction undergo chemisorption. This fraction decreases with increasing temperature. The experimental data show that the theory (UFZh, 1, 734, Card 1/2

Adsorption of barium ...

S/181/62/004/009/009/045  
B108/B186

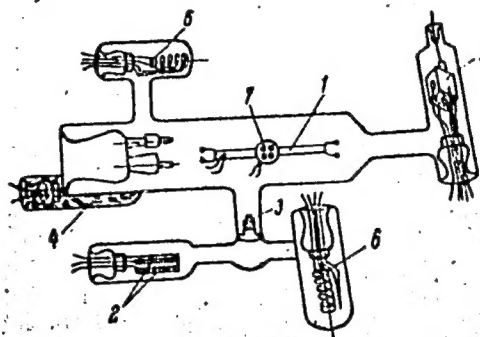
1959; Kinetika i kataliz - Kinetics and catalysis - 2, no. 4, 1961; DAN SSSR, 141, 1124, 1961) gives a satisfactory qualitative and quantitative description of the functions  $\varphi(n)$  and  $q(n)$ . There are 10 figures.

ASSOCIATION: Institut fiziki AN USSR Kiyev (Physics Institute AS UkrSSR, Kiyev)

SUBMITTED: April 2, 1962

Fig. 3.

Legend: (1) tungsten single crystal backing, (2) CO and O<sub>2</sub> sources, (3) diaphragm, (4) getter pump, (5) mass spectrometer, "omegatron", (6) ionization manometers, (7) electron gun.



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VEDULA, Yu.S.; GAVRILYUK, V.M.; MEDVEDEV, V.K.

Effect of electron bombardment on the adsorption properties of a tungsten surface. Fiz. tver. tela 4 no.9:2550-2553 S '62.

(MIRA 15:9)

1. Institut fiziki AN UkrSSR, Kiyov.  
(Electrons) (Tungsten)

CAVRILYUK, V.M.; NAUMOVETZ, A.G.

Surface diffusion of adsorbed atoms in an electric field. Fiz.  
tver. tela 5 no.10:2792-2798 0 '63. (MIRA 16:11)

1. Institut fiziki AN UkrSSR, Kiyev.

L 8154-66

ACCESSION NR: AP5019887

EWT(m)/EPF(n)-2/EWP(t)/EWP(b)

IJP(c)

JD/mw/JG

UR/0181/65/007/008/2547/2549

AUTHOR: Vedula, Yu. S.; Gavrilyuk, V. M.

TITLE: Direct proof of the positive charge of adsorbed Th atoms

SOURCE: Fizika tverdogo tela, v. 7, no. 8, 1965, 2547-2549

TOPIC TAGS: thorium, physical diffusion, surface property, conduction electron, electron scattering, transport phenomenon, work function

ABSTRACT: In a search for experimental proof that electropositive adsorbed atoms have a positive charge, the authors investigated the surface diffusion of adsorbed Th atoms under the influence of a uniform electric field produced by the voltage drop in a conductor carrying electric current, and by the force of the "electronic wind" which is produced when the conduction electrons are scattered by the adsorbed atoms. The hypothesis was that if a film of adsorbed atoms is produced on the surface of the metal, and if the adsorbed atoms are capable of diffusing over the surface, then direct current flowing through the substrate should cause electric transport of the adsorbed-film matter along the crystal. The Th film was deposited on W, and the distribution of the work function along the crystal was measured by means of a moving electron gun, the position of which was measured with a micro-

Card 1/2

nw

Card 2/2

0902 019:

L 06436-67 ENT(m)/ENP(t)/ETI IJP(c) JD/JG

ACC NR: AP6026713

SOURCE CODE: UR/0181/66/008/008/2482/2484

AUTHOR: Gavrilyuk, V. M.; Medvedev, V. K.; Smereka, T. P.

ORG: Physics Institute, AN UkrSSR, Kiev (Institut fiziki AN UkrSSR)

TITLE: Adsorption of nitrogen on the (113) face of a tungsten single crystal

SOURCE: Fizika tverdogo tela, v. 8, no. 8, 1966, 2482-2484

TOPIC TAGS: tungsten, adsorption, nitrogen

ABSTRACT: The adsorption of nitrogen on the (113) face of a tungsten single crystal was studied under controlled purity conditions, and the functions  $\chi(n, T)$ ,  $\Delta\phi(n)$  and heats of adsorption  $q(n)$ , required for developing a modern theory of gas condensation and chemisorption, were determined at 300-1500°K ( $\chi$  being the condensation factor,  $n$  the concentration of adatoms, and  $\Delta\phi$  the change in the electronic work function). It was found that during the chemisorption of nitrogen at least two phases are formed, one with  $q = 5.1$  eV, the second with  $q \approx 2.2$  eV. There may be a third phase with  $q \approx 3.5$  eV. Measurements of the change  $\Delta\phi$  with time showed that there is desorption with association, i. e.,  $f(n) \sim n^2$ . Hence, in the first phase the nitrogen molecules during chemisorption dissociate into atoms, and in the second phase the adsorption is slower than in the first due to a small  $\chi$ . Orig. art. has: 2 figures and 1 formula.

SUB CODE: 20/ SUBM DATE: 08Feb66/ ORIG REF: 004/ OTH REF: 005

Card 1/1



ACC NR: AP6037061

SOURCE CODE: UR/0056/66/051/005/1332/1340

AUTHOR: Gavriluk, V. M. (deceased); Naumovets, A. G.; Fedorus, A. G.

ORG: Institute of Physics, Academy of Sciences, Ukrainian SSR (Institut fiziki Akademii nauk Ukrainoskoy SSR)

TITLE: Investigation of adsorption of cesium on a tungsten single crystal

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 5, 1966, 1332-1340

TOPIC TAGS: cesium, tungsten, work function, adsorption, crystal surface, epitaxial growing, *single crystal structure*

ABSTRACT: The purpose of the investigation was to obtain detailed quantitative data describing adsorption on substrates of known crystal structure, with emphasis on the cesium-tungsten system. To this end, the authors measured the work function for the (110), (112), (100), and (111) faces of a tungsten single crystal, as a function of the concentration of the cesium atoms adsorbed on the surface, by determining the field emission current from the individual faces in a Muller type electron projection tube. The experimental apparatus was similar to that used by the authors earlier for experiments with lithium on tungsten (FTT v. 8, 1821, 1966). The lowest work functions  $\phi$  of the various faces are in the range 1.35 - 1.55 ev; the concentration in this case is respectively  $2.6 \times 10^{14}$ ,  $3.2 \times 10^{14}$ ,  $3.8 \times 10^{14}$ , and  $4.0 \times 10^{14}$  at/cm<sup>2</sup> for the (100), (110), (112), and (111) planes respectively (the accuracy is 0.1 ev).

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ACC NR: AP6037061

The effect of the structure and of the work function of the substrate on the shape of the  $\phi(n)$  curve is discussed. The adsorption characteristics of cesium and lithium on tungsten are compared. Whereas in the case of cesium a correlation is observed between  $d\phi/dn$  and  $\phi$ , no such correlation is observed for lithium. The results also show that the role of the atomic structure of the surface increases markedly at high adsorbed atom concentrations, when two-dimensional epitaxial crystals of the adsorbate are produced. It is concluded that a knowledge of the structure of the films is just as important for a correct understanding of the mechanism of adsorption as a knowledge of the structure of the substrate. Orig. art. has: 4 figures and 1 table.

SUB CODE: 20/ SUBM DATE: 09Jun66/ ORIG REF: 011/ OTH REF: 008

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2775 12/01 7.3.

SOV/137-57-11-21687

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 11, p 149 (USSR)

AUTHOR: Gavrilyuk, V.S.

TITLE: Deposition of Brass on Steel and Cast Iron by Means of Resistance Welding (MVTU Method) [ Naplavka latuni na stal' i chugun metodom soprotivleniya (metod MVTU) ]

PERIODICAL: Tr. Stud. nauchno-tekhn. o-va MVTU im. Baumana, 1957, Vol 3, pp 14-22

ABSTRACT: The process is based on a short-circuit condition without an electric arc. A brass welding rod, fed through a central orifice in the carbon electrode, is melted by the heat resulting from the contact resistance between the electrode and the parent metal. The distribution of heat generated in the contact area is not uniform: A greater part of it is consumed by heating the parent metal, while the smaller remainder melts the brass. Considerable heat dissipation in conjunction with the relatively limited generation of heat in the zone of contact prevents fusion of the parent metal; however, even this quantity of heat is sufficient to create a temperature on the surface of the parent metal which is greater than the melting point of

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SOV/137-57-11-21687

Deposition of Brass on Steel and Cast Iron (cont.)

brass; consequently, the processes of wetting and diffusion are speeded up because the forces of surface tension in Cu alloys and Fe diminish with increasing temperatures. The process of deposition of metal by welding may be controlled by varying the welding conditions. In order to remove any oxide films and impurities on the surface of the parent metal, special "active" fluxes were developed containing borax, Fe-Mn, fluorspar, KCl, NaCl, etc. Protective fluxes are employed in order to prevent the molten metal from reacting with the surrounding atmosphere and to preclude the formation of beads.

V.K.

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AUTHOR: Gavrilyuk, V.S., Engineer

S/135/60/000/008/003/010  
AC06/AG02

TITLE: The Estimation of the Weld Metal Resistance to Hot Crack Formation  
in Arc-Welding of Steel 18

PERIODICAL: Svarochnoye proizvodstvo, 1960, No. 8, pp. 10-12

TEXT: The 1956 GOST project for the evaluation of weld metal resistance to hot cracks, contains six types of specimens and corresponding test modes. Specimens are provided for the qualitative (types I, II and III) and for the quantitative (types IV, V and VI) estimation of the factor to be determined. Comparison tests of variants I, II and IV were made at the experimental laboratory "Technological Strength of Metals in Welding" of MVTU imeni Bauman. Specimens of type III, V and VI were not included in the tests, since the methods recommended by the GOST project were considered as unsatisfactory. The MVTU test method was used for the quantitative determination of hot crack resistance of the base metal by taking into account the electrodes, the flux and the welding wire used. The purpose of the tests was the selection of efficient types of specimens yielding the most complete agreement with results obtained in welding of rigid joints. Therefore, the specimens of type IV

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A006/A002

The Estimation of the Weld Metal Resistance to Hot Crack Formation in Arc-Welding of Steel

were replaced by the following types of joints: butt welds without beveled edges, stretched perpendicularly to the direction of welding (Figure 1a); T-welds deformed along the direction of welding (Figure 1b); and splitted butt welds deformed along the direction of welding (Figure 1v). The MVTU tests were carried out using low carbon steel of the following composition: 0.15% C, 0.30% Si, 0.56% Mn, 0.03% P and 0.03% S. The effect of the composition of the electrode coating on hot crack formation was studied on coatings ensuring low or relatively high resistance of the weld metal against hot cracks. The first type included "OMM-3" and "L-3" (Ts-3) coatings, the second type "LM-7" (TsM-7), "M33-04" (MEZ-04) "OMM-2" and three variants of "OMM-5" coatings. These variants were selected at the request of the Moskovskiy zavod metallicheskih elektrodov, Moscow Plant of Metal Electrodes for determining the optimum permissible proportion of blast and arc furnace ferro-manganese (OMM-5/2 and OMM-5/3) and for establishing the possibility of replacing fluorspar in the coating by granite (OMM-5/1 and OMM-5/2). Qualitative tests were performed at MVTU and the Moscow Plant of Metal Electrodes. The tests at the Plant were made with St.3 steel and T-welds with 2 seams. The welding parameters were: 22 amps current, 24 v arc voltage and 10.2 m/hr welding speed. The electrode tests

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A006/A002

The Estimation of the Weld Metal Resistance to Hot Crack Formation in Arc-Welding of Steel

at MVTU were carried out after roasting the electrodes for 2 hours at 450°C. A T-weld with welded-on rigid ribs was made. The welds were subjected to visual and metallographic inspection to reveal cracks in the seam root. Type I specimens (2 plates welded by 3 angular joints) were also tested. Results of the tests are given in tables. Best results were obtained with OMM-5/1, OMM-5/2, TsM-7 and OMM-2 electrodes. Ts-3 and OMM-3 electrodes proved to be unsatisfactory. OMM-5/3 and MEZ-04 electrodes ranged between both types. Quantitative tests carried out with T- and butt welds by the MVTU method were made under the same welding conditions as the qualitative estimation. The results are given in Graph 2. The following conclusions are made: It is recommended to use a rigid T weld with two-sided seams for estimating the proneness of steel to welding cracks. For the quantitative estimation the effect of the crystallization system on strength characteristics must be taken into account. For this purpose the tests should be performed with different types of weld. In the OMM-5 electrode, the replacement of fluorspar by granite has only a slight effect on the proneness to hot cracks of the weld metal. The full replacement of electric furnace ferromanganese by blast furnace

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A006/A002

The Estimation of the Weld Metal Resistance to Hot Crack Formation in Arc-Welding  
of Steel

ferromanganese is not recommended, impairing the quality of the connection  
particularly in T-welds. There are 4 tables, 2 figures and 2 Soviet references. ✓

ASSOCIATION: MVTU imeni Bauman

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GAVRILYUK, V. S.

Cand Tech Sci - (diss) "Study of the technological strength of metals and alloys in welding." Moscow, 1961. 22 pp with diagrams; (Ministry of Higher and Secondary Specialist Education RSFSR, Krasnoyarsk Inst of Non-Ferrous Metals imeni M. I. Kalinin); 200 copies; price not given; (KL, 7-61 sup, 233)

23282  
S/135/61/000/007/005/012  
A006/A106

1.2300 also 1573

AUTHOR: Gavrilyuk, V. S., Engineer

TITLE: Determining the plasticity of welds during crystallization

PERIODICAL: Svarochnoye proizvodstvo, no. 7, 1961, 17-19

TEXT: Prokhorov and Bochay from MVTU imeni Bauman investigated in 1956-58 the strength and plasticity of aluminum-copper and aluminum-silicon alloys within the brittleness temperature range (Svarochnoye proizvodstvo, no. 2, 1958). However, the indicated characteristics were obtained only for low-melting alloys and were applicable only to casting processes. Similar investigations for steels, considering their welding conditions, have as yet not been performed. In 1958 the author attempted to determine the plasticity and the brittleness temperature range of a crystallizing weld joint during welding process with various electrode types. The experiments were made for the purpose: of confirming the hypothesis of intercrystalline strength proposed by MVTU imeni Bauman, applicable to crystallizing weld joints; of determining the correlation of the basic characteristics (temperature range of brittleness, plasticity, deformation and proneness of the weld joint to the formation of hot cracks during welding); of revealing the

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Determining the plasticity of welds during ...

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effect of various factors on the proneness to hot crack formation, and of indicating some possible means to raise the resistance of the welds to hot cracks. The author developed the following investigation method using a special device. The temperature range of brittleness was determined by a method illustrated in Fig. 1 where two parts of the specimens to be welded were clamped within specially designed jaws. One of the jaws was fixed, the other one was movable to a given distance. From the liquidus temperature to the upper limit of the brittleness range the crystallizing seam withstands the deformation applied without failure, due to the high ductility of the alloy. From the upper limit of the brittleness temperature range the given deformation exceeds plasticity and the failure of the weld joint takes place. This is observed over the whole range of brittleness down to the lower limit of brittleness temperature, when the plasticity of the crystallizing joint sharply increases and cracks do not occur. To determine plasticity within the brittleness range, the specimens were deformed to different degrees, to determine maximum deformation prior to failure. The degree of deformation serves to determine the plasticity of the crystallizing joint at a given temperature. A device designed for the described tests is shown in Fig. 2. Sample 1 composed of two plates (30 x 60 x 6 mm) to be welded is fastened on two tables 2. The gap between the plates is constant (0.5 mm). The left hand table

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Determining the plasticity of welds during ...

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is fixed, the right-hand one can be moved to the right-hand side as far as stop 4, due to the effect of plate spring 3 of 500 kg force. The gap between table 2 and stop 4 can be varied by special inserts 5. The magnitude of the gap determines the deformation applied to the specimen. Time relay 6 sets up the beginning of deformation, and switches on electromagnetic coil 7, which tightens the spring cock. The released spring moves the table with the specimen to stop 4. The first three specimens are welded with the selected electrodes to determine the thermal welding cycle for plotting a  $T = f(t)$  diagram. This is necessary to determine the test temperature, since the initial moment of deformation will furthermore be determined by the time. Temperature changes in time are determined with a platinum-platinum-rhodium thermocouple which is introduced into the molten weld metal. The time and temperature are oscillographically recorded on a film. The experiments were carried out with weld joints produced on low-carbon steel containing 0.15% C; 0.30% Si; 0.56% Mn; 0.03% P; 0.031% S. The following electrodes were used: OMM-5-1 (OMM-5-1), M93-04 (MEZ-04), OMM-3 (OMM-3); 4-3 (Ts-3) and УОНН-13/45 (UONI-13/45). Comparing the data obtained which are characteristic of the properties of the crystallizing weld joint ( the upper and lower brittleness range, and the nature of the plasticity curve within the upper and lower brittleness range) the main parameter can be found determining the

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Determining the plasticity of welds during ...

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Table:

a) Grade of electrode; b) Temperature range of brittleness in °C; c) Difference of temperatures  $P_{gr}$ ; d) Rated plasticity of the alloy  $T_{gr}$  in °C; e) Critical rate of increasing deformation  $\frac{P_{gr}}{T_{gr}} 10^3$ ; f) Index of the weld joint resistance to hot crack formation  $A$  in mm/min. There are 6 figures, 1 table, and 1 Soviet-bloc reference.

ASSOCIATION: MTVU imeni Bauman

Марка электрода a)	Температурный интервал хрупкости (ТНХ) в °C b)	Разность температур $P_{gr}$ c)	Расчетная пластичность сплава $\Delta T_{gr}$ в °C d)	Критический темп нарастания деформации $\frac{P_{gr}}{\Delta T_{gr}} 10^3$ e)	Повышенный коэффициент пластичности при образовании горячих трещин $A$ в мм/мин f)
ОММ-5 . . . . .	150	55	0,2	3,62	8,05
МЭЗ-04 . . . . .	135	110	0,35	3,05	8,0
ОММ-3 . . . . .	205	170	0,2	1,18	0,55
И-3 . . . . .	215	185	0,2	1,05	5,65
УОНИ-13/45 (планка № 1) . . . . .	145	115	0,9	7,8	13,5
УОНИ-13/45 (планка № 2) . . . . .	130	120	0,75	0,6	10,95

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GAVRILYUK, V.S., kand.tekhn.nauk; POPOVA, M.N., inzh.

Errors in the theory of the mechanical strength of metals during  
crystallization. Svar.proizv. no.4:30-32 Ap '62. (MIRA 15:3)

1. Moskovskoye vyssheye tekhnicheskoye uchilishche imeni Baumana.  
(Thermal stresses) (Crystallization)



GAVRILYUK, V.S., inzh.

Investigating the efficiency of casting ferromanganese for  
electrode coverings by the method of forced zonal liquation.  
Trudy MVTU no.106:130-134 '62. (MIRA 16:6)  
(Ferromanganese--Metallurgy) (Electrodes)

GAVRILYUK, V.S., inzh.

Determining the optimum proportion of blast furnace to electric  
furnace ferromanganese for electrode coverings of the MEZ-T type.  
Trudy MVTU no.106:135-136 '62. (MIRA 16:6)  
(Ferromanganese--Metallurgy) (Electrodes)

PROKHOROV, N.N., doktor tekhn.nauk, prof.; GAVRILYUK, V.S., inzh.;  
YAKUSHIN, B.F., inzh.

LTP-1-4 universal machine for the determination of weld  
resistance to hot cracks during welding. Trudy MTU no.106:  
114-122 '62. (MIRA 16:6)  
(Testing machines) (Thermal stresses—Testing)

12200

L1865  
S/549/62/000/106/004/010  
1003/1203

AUTHORS: Prokhorov, N.M., Doctor of Technical Sciences, Professor,  
Gavrilyuk, V.S., *Ingenieur*; and Yakushin, B.F., *Ingenieur*

TITLE: Universal testing machine  $\Sigma T \Pi-1-4$  (LTP-1-4) for determining the  
resistance of welds to hot cracking

SOURCE: Moscow. Vvashoye tekhnicheskoye uchilishche. [Trudy] no. 106, 1962.  
114-122. Svarka tsvetnykh splavov i nekotorykh legirovannykh staley

TEXT: The main draw-back of testing machines in use at present is the dis-  
crepancy between the conditions under which the deposited metal solidifies during  
service and those during testing. The excellent performances claimed for this  
machine permit the obtaining of welding conditions comparable with practical ones.  
The machine consists of the following essential elements: 1. a device for stress-  
ing the sample; 2. a welding device; 3. devices for recording the testing con-  
ditions. A comparison of the data obtained by this method (called MBTV (MVTU))  
with those obtained by testing samples welded under industrial conditions showed a  
satisfactory agreement and the authors therefore recommend the use of this machine  
in all industrial and scientific laboratories. There are 7 figures.

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S/137/63/000/002/021/034  
A006/A101

AUTHOR: Gavrilyuk, V. S.

TITLE: Investigating the efficiency of ferromanganese casting for electrode coatings by the method of forced zonal segregation

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 2, 1963, 26, abstract 2E154  
(In collection: "Svarka tsvetn. splavov i nekotorykh legirovan. staley", MVTU, 106, Moscow, 1962, 130 - 134)

TEXT: To produce a high-quality welding wire N. N. Prokhorov, MVTU, has proposed and industrially used a method of steel casting which is based on using forced zonal segregation and secures the production of steel with a minimum C, S and P content. In the lower, purer, section the ingot contains in %: S 0.015, P 0.01 and C 0.05; in the top section S 0.08, P 0.03 and C 0.19. At MVTU tests were made to reveal the efficiency of ferroalloy casting for electrode coatings using forced zonal segregation. The ferroalloys produced by this method were used as components for the coating of UM-7 (TsM-7) grade electrodes. The test results show that the use of ferroalloys for electrode coatings, produced by

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Investigating the efficiency of...

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A006/A101

forced zonal segregation, secures welded joints with stabler strength characteristics and which are less prone to the formation of hot cracks during welding.

V. Klyuchnikova

[Abstracter's note: Complete translation]

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L 8853-66 EWP(e)/EWT(m)/EWP(w)/EWP(v)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(h)/EWA(c)  
 ACC NR: AP5026516 JD/HM/WB SOURCE CODE: UR/0286/65/000/019/0048/0048  
 INVENTOR: Gavrilyuk, V. S.; Ivochkin, I. I. 44,55 44,55 50 B  
 ORG: none  
 TITLE: Method of introduction of a powdered modifier. Class 21, No. 175158  
 SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 19, 1965, 48  
 TOPIC TAGS: metal, metal welding, weld modifier, weld defect, welding technology, weld hot cracking 44,55  
 ABSTRACT: An Author Certificate has been issued for a method for the introduction of a powdered modifier into the solidifying portion of a weld. To improve the weld resistance to hot cracking, prevent oxidation of the modifier, and ensure a uniform distribution of the modifier throughout the weld, the modifier is introduced by a jet of shielding gas. [AZ]  
 SUB CODE: 13/ SUBM DATE: 10Mar64/ ATD PRESS: 4152  
 Bvk  
 Card 1/1 UDC: 621.791.856.046

CAVRILYUK, V.S.; RECHMEDIN, I.O.; BEZUGLIY, A.M., dotsent; kandidat geologo-mineralogichnikh nauk, vidnovidal'niy redaktor; SIKACH, M.P., redaktor; KHOKHANOVS'KA, T.I., tekhnicheskiiy redaktor

[The natural setting of Kiev and its environs; physical geography characteristics] *Prýroda Kyieva ta ioho okolyts'*; fizyko-geografichna kharakterystyka. [Kyiv] Vyd-vo Kyivs'koho derzh. univ. in. T.H.Shevchenka, 1956. 68 p. (MLRA 9:10)  
(Kiev--Description)



GAVRILYUK, V.S. [~~Gavriluk, V.S.~~], dots.

In Egypt. Nauka i zhyttia 8 no.5:47-49 My '59. (MIRA 13:4)  
(Egypt--Description and travel)

GAVRILYUK, V.S. [Havryliuk, V.S.], dots., kand. geogr. nauk

In India. Nauka i zhyttia 9 no.6:56-59 Ju '59.

(MIRA 12:8)

(India--Description and travel)

GAVRILYUK, V.S. [Havryliuk, V.S.], kand.geograf.nauk, dotsent

Through Morocco and Tunisia. Nauka i zhyttia 11 no.6:52-53 Je '61.  
(MIRA 14:7)

(Tunisia--Description and travel)  
(Morocco--Description and travel)

GAVRILYUK, V.S. [Havryliuk, V.S.]

Along the roads of Morocco and Tunisia. Geog. zbir. no.6:  
157-164 '62. (MIRA 15:9)

(Morocco--Description and travel)

(Tunisia--Description and travel)

S/169/63/000/002/057/127  
D263/D307

AUTHOR: Gavrilyuk, V. S.

TITLE: The mineral riches of Western Polesiye of the UkrSSR

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 2, 1963, 2, abstract 2D12 (Visnik. Kyivs'k. un-tu, 1960 (1961), no. 3, Ser. heol. ta heohr., no. 2, 62-66 (Ukr.; summary in Rus.))

TEXT: A short characteristic is given of the available minerals, indicating their geographic location and problems of their utilization. Bog iron is found in a number of regions. According to Polish geologists, the reserves of iron in Sarnensk are equal to 12,000 t, in Kostopil'sk 27,000 t, and in Rovno 10,000 t. The estimated reserve of these ores is 0.1 - 0.5. The ores may be used by local industry. Manganese deposits are represented by complex iron ores. It is suggested that these may be used to develop a metallurgical industry and as microfertilizer. Useful fuel deposits are represented by stone and brown coal, and by peat. The

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S/169/63/000/002/057/127  
D263/D307

The mineral riches ...

L'vov-Volyn stone coal basin covers an area of 18,000 km<sup>2</sup>. The coals belong to the Namur series of the Lower Carboniferous and lie at a depth of 330 - 750 m, seams of workable thickness being at depths of 315 - 535 m. Quality of the coal is high - grades T, A and ПЖ (G, D and PZh) - and the reserves amount to 1.5 milliard tons. According to the 7-year plan, 42 mines will be constructed, with an output of 20 million tons of coal. Deposits of brown coal (in the villages of the northern Botin-Tuchinskiy region) are not worked since the reserves are very small and coal quality is poor. The peat area of Western Polesiye is 113,672 hectares. The peat fields of the Klenbanskiy, Berbskiy, Sarnenskiy etc. regions are of industrial significance. Kaolin deposits are associated with the weathered layers of crystalline rocks and occur in the NW of the Ukrainian crystalline shield. In the Rovenskiy, Lutskiy, Kovel'skiy and other regions is found amber, and deposits of graphite exist in the Sluch river valley, in the vicinity of the villages of Bil'chakov and Korts, and in the valleys between villages Usten and Glybokov, between Kostov and Maydan Moreninskiy, in the

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The mineral riches ...

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D263/D307

regions of Sosnovo and Pogulyanka. In the eastern part of Western Polesiye may be found deposits of topaz and mountain crystal. Numerous deposits of constructional materials are also available in Western Polesiye - granites, gneisses, slates, Rapakivi granites, gabbro-norites, effusive rocks, basalts, chalk and chalkey marls, and sands. [Abstracter's note: Complete translation.]

Card 3/3

REMEZ, Ye.Ya.; GAVRILYUK, V.T.

Some remarks on rational-polynomial Chebyshev approximations of  
functions as compared to segments of factorizations of Chebyshev  
polynomials. Ukr. mat. zhur. 15 no.1:46-57 '63. (MIRA 16:3)  
(Chebyshev polynomials)  
(Functions, Transcendental)



Name: GAVRILYUK, V. T.

JPRS/DC-279

CSO DC-1241

Dissertation: Some problems in the convergence of multidimensional  
singular integrals

Degree: Cand Phys-Math Sci

~~DEPENDENT~~

~~Address~~: Acad Sci Ukrainian SSR, Inst Mathematics

~~PUBLICATION~~

~~Defense Date~~, Place: 1956, Kiev

Source: Knizhnyaya Letopis', No 52, 1956

*also in Publ. - Dop. AN URSR, No. 6, 523-526 '56.*

16(0)

PHASE I BOOK EXPLOITATION

SOV/3330

Gavrilyuk, Vera Trofimovna

Nekotoryye voprosy skhodimosti mnogomernykh singulyarnykh integralov (Some Problems on the Convergence of Multidimensional Singular Integrals)  
Kiyev, Izd-vo AN UkrSSR, 1958. 48 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk USSR. Institut matematiki.

Resp. Ed.: Ye.Ya. Remez, Corresponding Member, Ukrainian SSR Academy of Sciences; Ed. of Publishing House: I. V. Kisina; Tech. Ed.: S.M. Bogdanov.

**PURPOSE:** This book is intended for scientific workers and students taking advanced courses in mechanics and mathematics.

**COVERAGE:** This book treats problems of the convergence of multidimensional singular integrals at Lebesgue points of p-th order functions of the classes LP. The book is divided into two chapters. Chapter I discusses the theory involved. Chapter II describes the application of the general criteria of convergence, obtained in Chapter I, to a study of important specific types

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Some Problems on the Convergence of (Cont.)

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of multidimensional singular integrals. Detailed attention is paid to two classical examples of the Poisson and Fejer multidimensional singular integrals. In regard to these integrals, one of the principal problems which has remained unsolved since the appearance of the published works of Geiringer (reference 30) and Tonelli (reference 47) is solved. The author thanks Ye.Ya. Remez, Corresponding Member of the Academy of Sciences, Ukr SSR. There are 52 references: 23 Soviet, 14 German, 9 English, 4 French, and 2 Italian.

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Some Problems on the Convergence of (Cont.)

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4. Study of the convergence of the singular integral with the fixed point of singularity  $u_0$  ( $\Phi(u, u_0) \equiv \Phi(u)$ ) and with index  $\sum m$  which takes on integral values at Lebesgue points if order  $p$  ( $1 < p < \infty$ ) 19
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References

AVAILABLE: Library of Congress (QA295.G35)

AC/r1 48  
4-13-60

Card 3/3

GNEDENKO, B.P. [Hniedenko, B.V.], akademik; GAVRILYUK, V.T. [Havryliuk, V.T.].

International connections of the Institute of Mathematics of the  
Academy of Sciences of the Ukrainian S.S.R. Visnyk AN URSS 29 no.3:  
66-67 Mr '58. (MIRA 11:5)

1. AN URSS (for Gnedenko).  
(Academy of Sciences of the Ukrainian SSR)

87142

S/041/60/012/003/006/011  
C111/C222

1 L. 4100

AUTHORS: Remez, Ye.Ya., and Gavriluk, V.T.

TITLE: Numerical Elaboration of Some Arrangements for an Approximate Construction of the Solutions of Chebyshev Problems With Parameters Appearing Nonlinear. I.

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, 1960, Vol. 12, No. 3, pp. 324 - 338

TEXT: The paper contains a detailed representation of the results formulated by Ye.Ya. Remez in (Ref. 3,4) and a number of numerical examples calculated with table-computers in the Calculation Laboratory of the Mathematical Institute of the Academy of Sciences of the Ukrainskaya SSR under the leading of V.T. Gavriluk.

The authors consider the problem

$$(1) \max_{\varphi \in E} | \phi(\varphi; z_1, \dots, z_n) - \bar{L}(z_1, \dots, z_n) | = \bar{L}(z) = \min(\bar{\varphi}) .$$

where the abstract argument  $\varphi$  of the function  $\phi$  continuous in  $\varphi$  varies in a given compactum  $E$ , while the parameter vector  $z$  varies either in the Card 1/4

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C111/C222

Numerical Elaboration of Some Arrangements for an Approximate Construction of the Solutions of Chebyshev Problems With Parameters Appearing Nonlinear.I. whole Euclidean  $R_n$  or in an open set  $G \subseteq R_n$ , where  $\phi(\tau; z)$  is two times continuously differentiable with respect to  $z_1, \dots, z_n$ . By replacing  $E$  by a suitably (cf. (Ref. 2, § 31)) chosen subset - the net  $e_N = \{\tau_1, \dots, \tau_N\} \subset E$  ( $N > n$ ) - the solution of (1) is reduced to the solution of

$$(4) \max_{\tau \in e_N} |\phi(\tau; z)| = \max_{i=1, N} |\phi(\tau_i; z)| = L(z) = \min(-\rho)$$

This problem is understood (in the sense of Chebyshev's best uniform approximation) as the problem of the solution of  $N$  incompatible equations with  $n$  unknowns:

$$(5) \phi(\tau_i; z_1, z_2, \dots, z_n) = 0, \quad i = \overline{1, N}$$

If  $z^*$  is an approximate solution of (4) and putting  $z_j - z_j^k = \zeta_j$  then

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Numerical Elaboration of Some Arrangements for an Approximate Construction of the Solutions of Chebyshev Problems With Parameters Appearing Nonlinear.I

from (5) one obtains by an approximate linearization

$$(6) \quad \phi(\varphi_1; z^*) + \sum \zeta_j \frac{\partial}{\partial z_j} \phi(\varphi_1; z^*) = \tilde{\phi}_1(\zeta) = \sum_{j=1}^n a_{ij} \zeta_j + b_i = 0$$

(i = 1, N)

If  $\zeta = \zeta^{(0)}$  is a Chebyshev solution (cf. (Ref. 2)) of the incompatible system (6) then  $z_* = z^* + \zeta^{(0)}$  is the improved solution of (4). If it is not enough exact, then the method is continued by linearization now (5) by the value  $z_*$  etc.

The successive linearizations are carried out under a permanent control whether

$$(2) \quad \bar{L}(z_*) - \bar{\vartheta} = \bar{L}(z_*) - \inf_{z \in G} \bar{L}(z) < L(z_*) - \bar{A}$$

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Numerical Elaboration of Some Arrangements for an Approximate Construction of the Solutions of Chebyshev Problems With Parameters Appearing Nonlinear. I

is satisfied, where  $\bar{A}$  denotes the lower boundary which is fixed for  $\bar{\xi}$  (cf. (Ref. 2) in the linear case). The improved solution must often be chosen

not in the form  $z_t = z^* + \xi^{(0)}$  but as  $z_k = z^* + \alpha \xi^{(0)}$  ( $0 < \alpha \leq 1$ )

in order to guarantee the monotone decrease of  $L(z)$  in (5).

Three numerical examples are given.

There is 1 table and 19 references : 13 Soviet, 3 German, 2 English and 1 Belgian.

[Abstracter's note : A detailed understanding of the present paper (especially of the examples) is only possible with the knowledge of the book of Remez (Ref. 2) since the authors permanently refer to (Ref. 2) and use notions and notations of (Ref. 2) without any explanation. (Ref. 2) concerns the book of Ye.Ya. Remez : General Numerical Methods of Chebyshev's Approximations, 1957]

SUBMITTED: January 14, 1960

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22765  
S/041/61/013/001/004/008  
B112/B202

AUTHORS: Remez, Ye. Ya., Gavriluk, V. T.

TITLE: Numerical elaboration of certain ansatzes for the approximate construction of solutions of Chebyshev problems in which parameters occur nonlinearly. II

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, v. 13, no. 1, 1961, 53-62

TEXT: The authors first study two approximate linearization methods in connection with a generalized Chebyshev interpolation method. In the following, they calculate one example by both methods. They consider a class of unidimensional Chebyshev problems which are nonlinear with respect to  $z = (z_1, \dots, z_n)$ :  $\max_{x \in [a, b]} |\psi(x, z) - f(x)| = \max_{x \in [a, b]} |\phi(x, z)|$   
 $= L = L(z) = \min(-q)^2$ , where  $\psi(x, z)$  is a function of the "interpolation class" - in the present paper referred to as "class  $\underline{A}$ ". The property  $\underline{A}$  characterizing class  $\underline{A}$  is the following: the difference  $\psi(x, z') - \psi(x, z)$  must not change its sign for any set of points  $\{x_v\}_{v=0}^n \subset [a, b]$  ( $x_0 < x_1 < \dots < x_n$ ).  
 This property is especially characteristic of the functions:  
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B112/B202

Numerical elaboration of...

$$\psi(x, z) = R(x, z) = \gamma(x) \frac{z_1 x^{p-1} + z_2 x^{p-2} + \dots + z_p}{z_{p+1} x^q + z_{p+2} x^{q-1} + \dots + z_{n+1}}, \quad (p + q = n). \quad \text{The}$$

solution of the formulated interpolation problem is based mainly on the solution of the set of  $n+1$  incompatible nonlinear equations  $\phi(x, z) = 0$ . The authors, instead, solve the "quasicompatible" set:  $\varepsilon(x, z) = v, \phi(x, z) = \tilde{q}$ ,  $v, = (-1)^v \text{sgn} \phi(x_0, z^*) = (-1)^v v_0^2, \min\{|\phi(x, z^*)|\} < \tilde{q} < \max\{|\phi(x, z^*)|\}$ .

This quasicompatible set is approximately linearized by a "symmetrical" and an "asymmetrical" method. The asymmetrical method can be used only for the solution of  $n$  equations:  $\varepsilon(x, z) = \tilde{q}$  of the quasicompatible set.

In this case  $\delta_{v_0} = \varepsilon(x_{v_0}, z) - \tilde{q}$  differs from zero, while the symmetrical method is used to determine all  $n+1$   $\delta_{v_0}$  by the method of the least squares. The authors illustrate both methods by the example of a

function:  $\psi(x, z) = \frac{z_1 x^2 + z_2 x + z_3}{x^2 + z_4 x + z_5}$ . There are 2 tables and 13 references:

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Numerical elaboration of...

9 Soviet-bloc and 4 non-Soviet-bloc.

SUBMITTED: April 1, 1960

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S/041/61/013/001/004/008  
B112/B202

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S/041/61/013/002/002/007  
B112/B229

25175

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16,4100

AUTHORS: Révész, E. J., and Gavriluk, V. T.

TITLE: Mathematical elaboration of certain processes to approximate a construction of Chebyshev problems with nonlinearly incoming parameters. III

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, v. 13, no. 2, 1961, 150 - 172

TEXT: The present closing part of the work, as the preceding part II (§ 4), deals with nonlinear Chebyshev approximation problems which can be adapted to the generalized Chebyshev interpolation method developed by E. J. Révész. The mathematical elaborations indicated in § 4 to approximate a realization of the Chebyshev interpolation steps were somewhat complicated, since they required, as preliminary phases, an explicit setting up of certain linearized systems of  $(n + 1)$  incompatible equations, and also a determination of the coefficients  $\{C_v\}_0^n$  of the linear dependence:

$$\sum_v C_v \varphi_v^{(m-1)}(\xi) = 0 \text{ between the linear forms}$$

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Mathematical elaboration of...<sup>25175</sup>

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B112/B229

$\varphi_v^{(m-1)}(\xi) = \sum_j a_j^{(m-1)} \xi_j$  ( $v = 0, \dots, n$ ). In the present part III of this work, a refined and considerably simplified method is developed to eliminate these preliminary phases, which no longer applies the principle of approximate linearization explicitly. This method works as follows: The  $k$ -th approximation  $z^{(k)}$  is determined each time by a system of equations:

$$\xi(x_{v_s}, z^{(k)}) = \frac{1}{n+1} \sum_{v=0}^n \xi(x_v, z^{(k-1)}) \quad (s = 1, \dots, n). \text{ With the notations:}$$

$$\lambda^{(k)} = \xi(x_{v_0}, z^{(k)}), \quad \mu^{(k)} = \frac{1}{n+1} \sum_{v=0}^n \xi(x_v, z^{(k-1)}) \text{ the following algorithm}$$

is obtained:

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Mathematical elaboration of...

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$$\mu^{(k)} = \frac{p^{(k)} \mu^{(k-1)} + q^{(k)} \lambda^{(k-1)}}{p^{(k)} + 1^{(k)}} \equiv \mu^{(k-1)} + \frac{q^{(k)} (\lambda^{(k-1)} - \mu^{(k-1)})}{p^{(k)} + q^{(k)}},$$

where  $q^{(k)} = h^{(k)} / |\mu^{(k-1)} - \mu^{(k-2)}|$ ,  $p^{(k)} = h^{(k)} / |\lambda^{(k-1)} - \lambda^{(k-2)}|$

with arbitrary (positive) proportionality factors  $h^{(k)}$ . Moreover,

$$\sum_{s=1}^n c_{\gamma_s} (\mu^{(k-2)} - \mu^{(k-1)}) + c_{r_0} (\lambda^{(k-2)} - \lambda^{(k-1)}) = 0 \quad \text{is approximately}$$

valid. There are 2 figures and 8 references: 5 Soviet-bloc and 3 non-Soviet-bloc.

SUBMITTED: February 1, 1960

Card 3/3

S/041/63/015/001/003/009  
B187/B102

AUTHORS: Remez, Ye. Ya, and Gavrilyuk, V. T. (Kiyev)

TITLE: Some remarks on rationally polynomial Chebyshev approximations of functions and comparison with partial-sum sections of the expansion of these functions in Chebyshev polynomials

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, v. 15, no. 1, 1963, 46-57

TEXT: Let  $f(x)$  ( $f \in C \equiv C(-1, +1)$ ) be a function continuous over the interval  $[-1, +1]$ ;  $\Pi_n(x)$  is assumed to be the polynomial of the least deviation for  $f$  and  $\max_{-1 \leq x \leq +1} |f(x) - \Pi_n(x)| = E_n[f]$ . Furthermore,  $S_n(x)$  is assumed to

be the  $n$ -th partial sum of the formal expansion of  $f$  in Chebyshev poly-

nomials  $T_\nu$ :  $S_n(x) = \sum_{\nu=0}^n A_\nu T_\nu(x)$  and  $\max_{-1 \leq x \leq +1} |f(x) - S_n(x)| = I_n[f]$ . An

attempt is made to explain the reciprocal relation between the two approximation forms on the basis of a survey of results obtained earlier by other authors. It is pointed out, in particular, that for the class  
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S/041/63/015/001/003/009

B187/B102

Some remarks on rationally ...

$C_M^{(n+1)}$  of the functions for which  $|f^{(n+1)}(x)| < M$  the exact upper bound (Bernstein) is:  $\Delta_M^n = \sup_{f \in C_M^{(n+1)}} E_n f = \frac{M}{2^n(n+1)!}$ . If, in addition, a

lower bound is given  $0 < N < |f^{(n+1)}|$  then the following estimations are valid:

$$\frac{N}{2^n(n+1)!} \leq E_n[f] \leq \frac{M}{2^n(n+1)!} \quad (7'), \quad \frac{N}{2^n(n+1)!} < |f_n| < \sigma_n \frac{M}{2^n(n+1)!} \quad (5').$$

According to Steklov  $\sigma_n = 1 + \frac{2}{\pi} \frac{(2n)!}{(2n+1)!} < 1 + 0.47 \sqrt{\frac{3}{2n+1}}$  (6).

In the known estimation  $1 < \frac{|f_n|}{E_n[f]} \leq 1 + \Lambda_n$  (11) the value for

$x = 0$  for the Lebesgue functions  $\Delta_n$  can be represented, according to A. Berger (Nova Acta Soc. scient. Upsalensis, 15, 1895, 1 - 33) in finite form:

$$\Lambda_n = \frac{1}{2n+1} + \frac{2}{\pi} \sum_{v=1}^n \frac{1}{v} \lg \frac{v\pi}{2n+1}. \quad (13)$$

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Some remarks on rationally ...

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At the Institut matematiki AN USSR (Mathematics Institute of AS UkrSSR) the values  $\Delta_n$  have been calculated up to  $n = 20$  to exactly 7 places and compiled in a table.  $I_n \sim E_n$  holds for functions where the quotient of neighboring, non-zero coefficients  $A_{\nu}$  of the expansion in  $T_{\nu}(x)$  tends to zero with increasing  $\nu$ . When concrete calculation processes are programmed it is convenient, in many cases, to replace certain functions by finite polynomials of smallest deviation (standard sub-programs). For calculating the coefficients of the polynomials  $\pi_n$  approaching  $\Pi_n$ , a polynomial algorithm developed by Ye. Ya. Remez and a method of G. Hornecker (Comptes Rendus, Paris, 246, 1958, 43 - 46) are recommended. Approximation polynomials of least deviation calculated by this method are given for:  $\sin \frac{\pi}{2}x \approx \pi_4(x)$ ,  $\cos \frac{\pi}{4}x \approx \pi_8(x)$ ,  $\sin \frac{\pi}{4}x \approx \pi_9(x)$ ,  $\ln \frac{1+az}{1-az} \approx \pi_7(x)$  with  $a = 5 - 2\sqrt{2}$ ,  $x \cdot \text{ctg} \frac{\pi}{4}x \approx \pi_{10}(x)$ . The coefficients of these are exactly calculated to 18 places with the corresponding numerical values for characterizing the corresponding soundness of the Card 3/4.

Some remarks on rationally ...

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B187/B102

approximation. There is 1 table.

SUBMITTED: December 28, 1961

Card 4/4

GAVRILYUK, V.T. (Kiyev)

Linear methods of summing Fourier series and the best approximation.  
Ukr. mat. zhur. 15 no.4:412-418 '63. (MIRA 17:4)

GAVRILYUK, V.T. (Kiev)

Extension of E.A. Remez's first polynomial algorithm to a problem  
involving the derivation of rational Chebyshev approximations. Ukr.  
mat. zhur. 16 no.5:575-585 '64. (MIRA 17:10)

GAVRILYUK, V.T. (Kiyev)

Multidimensional generalization of P.I. Romanovskii's theorem  
on the convergence of singular integrals. Ukr. mat. zhur. 17  
no.3:120-123 '65. (MIRA 18:6)

1 07258-67 EWT(d) IJP(c)  
ACC NR: AP6018635

SOURCE CODE: UR/0208/66/006/003/0560/0570

AUTHOR: Gavrilyuk, V. T. (Kiev); Mazanovskaya, T. Yu. (Kiev)

22  
B

ORG: none

TITLE: Auxiliary polynomial for the direct determination of Tschebyshev interpolation polynomial /6

SOURCE: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki,  
v. 6, no. 3, 1966, 560-570

TOPIC TAGS: Tschebyshev polynomial, interpolation, computer calculation, polynomial

ABSTRACT: For the approximate representation of continuous functions  $f(x)$  ( $-1 \leq x \leq 1$ ) in computer calculations, one often utilizes the polynomial  $S_n[f; x]$  which is a segment of the expansion of  $f(x)$  into Tschebyshev  $T_k(x)$  polynomial ( $k = 0, 1, \dots$ ). The paper presents new comprehensive tables of auxiliary polynomials  $G_v^{(n)}(x)$  ( $n = 1, 2, \dots, 10$ ;  $v = 0, \dots, n$ ) which permit an exceedingly simple determination of the polynomial  $P_n^o(x) \equiv P_n^o[f; x]$  representing the best approximation of the arbitrary real functions  $f(x)$  on a system of  $n + 2$  points of inflection of  $T_{n+1}(x)$ , i.e.,

$$\{x_i^{(n)}\} = \left\{ \cos \frac{(n+1-i)\pi}{n+1} \right\}_{i=0}^{n+1} \in [-1, 1].$$

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UDC: 518:517.949.12

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ACC NR: AP6018635

Two worked-out illustrative examples are also given. Orig. art. has: 32 formulas and 1 table.

SUB CODE: 12,09/ SUBM DATE: 03Jul65/ ORIG REF: 004/ OTH REF: 003

Card 212



GAVRILYUK, Vasiliy Vasil'yevich; FEL'GIN, M., red.

[Economic foundation for the complete annihilation of  
colonialism] Ekonomicheskie osnovy polnogo unichtozhe-  
niia kolonializma. Minsk, Izd-vo "Belarus'," 1963. 174 p.  
(MIRA 17:6)

GAVRILYUK, V.V.; MALOCHINSKAYA, A.M.

Selecting armor for communication cables laid along electric  
railroads on alternating current. Elektrosvias' 11 no.10:62-71  
0 '57. (MIRA 10:10)

(Electric cables)

GAVRILYUK, V.V., kand.tekhn.nauk; CHUPIK, V.P., inzh.

Shielding of cable circuits. Izv.vys.ucheb.zav.; energ. 3  
no.4:11-19 Ap '60. (MIRA 13:6)

1. Nauchno-issledovatel'skiy institut kabel'noy promyshlennosti  
(for Gavriluk). 2. Zavod "Asovkabel'" (for Chupik).  
(Shielding(Electricity))

GAVRILYUK, V.V.; MALOCHINSKAYA, A.N.; ARON, V.A.

New coaxial cables for television antennans. Elektrosvaz' 15  
no.6:69-71 Je '61. (MIRA 14:6)

(Television--Antennas)  
(Coaxial cables)

SOROCHKIN, Naftaliy Khaimovich; CHUDAKOV, Pavel Ivanovich; SHARLE,  
David Leonidovich; Primal uchastiye GAVRILYUK, V.V.;  
ANTIK, I.V., red.; SOLOGUBOV, V.I., tekhn. red.

[Collection of problems on the calculation and design of  
cables and wires] Sbornik zadach po raschetu i konstruiro-  
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Measurement of an ideal coefficient of protective magnetic  
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GAVRILYUK Ya. F.

PA 44/L9T5

USSR/Agriculture  
Agrology  
Biography

Mar 49

"Professor S. A. Zakharov and His Scientific  
Activity," F. Ya. Gavriluk, 2 pp

"Priroda" No 3

Zakharov, one of foremost USSR soil scientists,  
is now working on the problem of genesis, geog-  
raphy, and methods to increase fertility of soils  
near the Don and the soil in the Northern Cau-  
casus. He is associated with Rostov/Don State U  
niversity V. M. Molotov.

44/L9T5

GAVRILYUK, Ya. T.; KRYUKOV, V. L., redaktor; ORLOVA, V. V., tekhnicheskii  
redaktor; MOISEYENKO, G. D., tekhnicheskii redaktor.

[The repair of U-5 engines] Remont dvigatelei U-5. 2-e izd. Mo-  
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GAVRILYUK, Z.I.

~~Preserving metal parts with sodium nitrite solutions.~~ Avt. 1 trakt.  
prom. no.2:40-41 F '57. (MLRA 10:3)

1.Stalingradskiy traktornyy zavod. ,  
(Corrosion and anticorrosives)

SAVRIN, A.G.; PYLITSOV, I.M.

Device for a large-photograph fluorograph used in the examination  
of the skull, accessory nasal sinuses, and the spine. Vest. rent.  
1 rad. 40 no.2:57-58 Mr-Apr '65. (MIRA 18:6)

1. Poliklinika No.2 Baumanekogo rayona Moskvy.

KOLESANOV, F.F., kand.tekhn.nauk; GAVRIN, E.G., inzh.

Preparation of fluxed pellets from sulfurous magnetite concentration  
of Magnitogorsk and Sokolovka-Sarbay ores. Stal' 22 no.4:293-296  
Ap '62. (MIRA 15:5)

1. Chelyabinskiy nauchno-issledovatel'skiy institut metallurgii.  
(Sintering) (Magnetite)

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(Sintering) (Desulfuration)

KOLESANOV, F.F.; KONAREVA, A.S.; Prinimali uchastive: ABROSIMOV, V.V.;  
GAVRIN, E.G.; SUYETINA, G.F.; OLENNIKOV, B.I.; PANOV, O.V.

Nodulizing fine oxidized nickel ore by tumbling with subsequent  
firing. TSvet. met. 35 no.5:47-52, My '62. (MIRA 16:5)  
(Nickel ore) (sintering)

KOLESANOV, F.F.; KONAREVA, A.S.; Prinimali uchastiye: ABROSIMOV, V.V., inzh.;  
GAVRIN, E.G., inzh.; SUYETINA, G.F., laborant; OLENNIKOV, B.I.,  
laborant; PANOV, O.V., laborant

Pelletizing Ufaley deposit nickel ores with subsequent  
roasting. [Sbor. trud.] Nauch.-issl.inst.met. no.4:54-62  
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(Ufaley Range--Nickel ores)  
(Ore dressing)



AKHMATOV, A.P.; BLINOV, P.I.; BOLOTIN, V.F.; BORODIN, A.V.;  
GAVRIN, P.P.; ZAVOYSKIY, Ye.K.; KOVAN, I.A.; OGANOV, M.N.;  
PATRUSHEV, B.I.; PISKAREV, Ye.V.; RUSANOV, V.D.; SMOLKIN,  
G.Ye.; STRIGANOV, A.R.; FRANK-KAMENETSKIY, D.A.; CHEREMNYKH,  
P.A.; CHIKIN, R.V.

[Magnetoacoustic resonance in a plasma] Magnito-zvukovoi  
rezonans v plazme. Moskva, In-t atomnoi energii, 1960. 23 p.  
(MIRA 17:2)



27280

S/056/61/041/002/001/028  
B102/B205

26.2321

AUTHORS: Borodin, A. V., Gavrin, P. P., Kovan, I. A., Patrushev, B. I.,  
Nedoseyev, S. L., Rusanov, V. D., Frank-Kamenetskiy, D. A.

TITLE: Magnetoacoustic oscillations and the instability of an  
induction pinch

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,  
no. 2(8), 1961, 317 - 321

TEXT: The results of experiments on a plasma pinch are presented. The  
experimental arrangement used is schematically shown in Fig.1. A vacuum  
chamber ( $10^{-7}$  mm Hg, 450 - 500°C) made of quartz served as discharge space.  
Most experiments were performed in air ( $10^{-1}$  -  $10^{-2}$  mm Hg), and some of  
them in hydrogen, argon, xenon, and helium ( $10^{-1}$  -  $10^{-3}$  mm Hg). The  
magnetic field was generated by a homogeneous turn with an inductance of  
30 cm, and a 200-kw h-f generator was used for pre-ionization. The

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Magnetoacoustic oscillations and...

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behaviour of the discharge was studied with the aid of a quick-acting photorecorder, type CQP- 2M (SFR - 2M), and a magnetic probe. The directions of photographing are indicated in Fig.1 Pictures taken in the axial direction show that the incandescence of the gas in the first semiperiod appears in the form of an annular tube. This indicates that the radial oscillations originate from the cold plasma contained in the incandescing tube. Pictures were taken in intervals of  $0.3 \mu\text{sec}$ . The first pinch is attributed to the formation of a relatively weak shock wave. In air with a pressure of  $8 \cdot 10^{-2}$  mm Hg, the shock wave has a velocity of  $2.3 \cdot 10^6$  cm/sec and a front width of  $\sim 0.7$  cm. The discontinuity of the magnetic field at the axis is explained by collisions of strong shock waves. The radial oscillations are ascribed to magnetoacoustic oscillations of the plasma column. The boundary conditions prevailing in this case are analyzed in the following. The analysis is complicated by the fact that the plasma column is copper-shielded. The authors discuss two limiting cases, one of which is based on the assumption that the plasma oscillates as if it were completely enclosed by a copper shield. This assumption was found to be correct. The boundary condition  $J_1(kR) = 0$ , where  $kR \equiv \mu = 1.84, 5.3, \dots$

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(J - Bessel function), is satisfied here. Using results of Frank-Kamenetskiy the authors obtain the following relation for the frequency of magnetoacoustic oscillations:  $f = \frac{H}{2\pi R \sqrt{4\pi M(n_0 + n_1)}}$ , where M is the ion mass,  $n_1$  is the ion concentration, and  $n_0$  is the concentration of neutral particles. A comparison between experimental and theoretical results obtained for  $H_2$ ,  $N_2$ , and Ar shows that: 1) the dependence of the eigenfrequency on the gas mass is in good agreement with theory; 2) the agreement between the theoretical and experimental absolute values of the frequencies is worse, since many important facts have not been considered. Conclusions: Rapid transverse contraction of plasma results in the occurrence of free magnetoacoustic oscillations of the plasma column, which are damped in time. At the instant of maximum contraction of the annular tube of the plasma, "tongues" protruding along the field are ejected (inertial instability). The excitation of oscillations may be attributed to the rapid contraction of the annular tube without a field. The contraction is caused by shock waves. The tube is formed by the mixing of

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Magnetoacoustic oscillations and...

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X

the fields inside and outside the plasma, which have opposite directions. .  
Ye. K. Zavoyskiy is thanked for his interest in the work, and L. I. Rudakov  
for discussions. There are 6 figures, 1 table, and 10 references: 7 Soviet  
and 3 non-Soviet.

SUBMITTED: January 27, 1961

Legend to Fig.1: 1) 50-kv rectifier; 2) capacitor bank (27  $\mu$ f, 50 kv);  
3) gap in the turn for photographing; 4) turn for generating the magnetic  
field; 5) quartz vacuum chamber; 6) and 8) h-f generator; 7) magnetic  
probe; 9) starter; a) to pump; b) to oscilloscope; c) directions of  
photographing.

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BABYKIN, M.V.; GAVRIN, P.P.; ZAVOYSKIY, Ye.K.; RUDAKOV, L.I.; SKORYUPIN, V.A.

Turbulent heating of a plasma. Zhur. eksp. i teor. fiz. 43 no.2:  
411-421 Ag '62. (MIRA 16:6)  
(Plasma (Ionized gases)) (Electromagnetic waves)

BABYKIN, M.V.; GAVRIN, P.P.; ZAVOYSKIY, Ye.K.; RUDAKOV, L.I.;  
SKORYUPIN, V.A.

Capture and confinement of a turbulent heated plasma in  
a magnetic trap. Zhur. eksp. i teor. fiz. 43 no.4:1547-1549  
0 '62. (MIRA 15:11)

(Plasma (Ionized gases))  
(Magnetic fields)

ACCESSION NR: AP4019216

S/0056/64/046/002/0511/0530

AUTHORS: Baby\*kin, M. V.; Gavrin, P. P.; Zavoytskiy, Ye. K.; Rudakov, L. I.; Skoryupin, V. A.; Sholin, G. V.

TITLE: New results on the turbulent heating of plasma

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 511-530

TOPIC TAGS: plasma, plasma heating, turbulent plasma, heating, plasma electron heating, plasma ion heating, collisionless plasma heating, plasma confinement, plasma confinement time, electron confinement time, ion confinement time

ABSTRACT: This is a continuation of earlier work by the same authors on turbulent plasma heating in a rapidly alternating magnetic field (Yaderny\*y sintez, Appendix III, 1962; ZhETF, v. 43, pp. 411, 1547, and 1976, 1962). The present paper reports the results of experiments with a net setup, the parameters of which have made possible (1) rapid collisionless heating of the plasma electrons to 1.5 keV by a strong hydrodynamic wave propagating in the plasma transversely

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through the magnetic field; (2) investigations of the confinement of a plasma in a magnetic trap; (3) observations of the collisionless heating of ions, which accompanies the turbulent heating of the electrons under certain conditions. The electron temperature was determined from the absorption of the electron bremsstrahlung in thin carbon films, from the ratio of the rates of decay of various spectral lines, and from readings of a probe. The plasma concentration was determined by optical means. The noise produced in the plasma was due to ion cyclotron oscillations and to magnetic sound resonance. A plasma electron pressure of  $10^{15}$  eV/cm<sup>3</sup> (approximately 20% of the alternating magnetic field pressure) was obtained in the concentration range from  $10^{12}$  to  $10^{13}$ /cm<sup>3</sup>. Confinement times were  $\sim 130 \mu\text{sec}$  for  $\sim 100$ -eV ions and  $\sim 60 \mu\text{sec}$  for 500-eV electrons. No strong instabilities were observed during the time of plasma confinement in the trap. Ion cyclotron waves and natural oscillations of the plasma column were

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ACCESSION NR: AP4019216

observed. A theoretical mechanism is proposed for this electron heating and is found to agree qualitatively with experimental results. Orig. art. has: 17 figures and 10 formulas.

ASSOCIATION: None

SUBMITTED: 13Aug63

DATE ACQ: 27Mar64

ENCL: 01

SUB CODE: PH

NO REF SOV: 008

OTHER: 002

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51"

L 14032-65 EEC(b)-2/EPA(w)-2/ENG(k)/ENT(1)/EEG(t)/EPA(sp)-2/T/EWA(m)-2  
PI-4/PO-4/PZ-6/PAB-10 ASD(a)-5/AFWL/AEDC(b)/AEDC(a)/SSD/ASD(p)-3/AFETR/  
ESD(gs)/ESD(t)/IJP(c) AT  
ACCESSION NR: AP4047934 S/0056/64/047/004/1597/1600

AUTHORS: Baby\*kin, M. A.; Gavrin, P. P.; Zavoyksiy, Ye. K.; Ruda-  
kov, L. I.; Skoryupin, V. A.

TITLE: Turbulent heating of a plasma in a direct discharge

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47,  
no. 4, 1964, 1597-1600

TOPIC TAGS: turbulent plasma, plasma heating, discharge plasma,  
ionized plasma, plasma injection, bremsstrahlung

ABSTRACT: A direct experiment in which the discharge is produced  
between end electrodes is reported, aimed at explaining the strong  
electron heating observed in an earlier investigation by the authors  
(ZhETF v. 46, 1050, 1964), and which cannot be attributed to turbu-  
lent heating by the magnetohydrodynamic wave. A current was made  
to flow through a fully ionized plasma with density  $\sim 10^{12} \text{ cm}^{-3}$ , pro-

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duced by plasma injectors. The plasma was adiabatically compressed by a factor 25 after heating by the current. The magnetic field at the instant of injector operation and during the direct discharge was 350 Oe, and rose to  $9 \times 10^3$  Oe at the maximum of compression. The electron temperature estimated from the spectral distribution of the bremsstrahlung is  $\sim 200$  keV, and the ion temperature  $\sim 3$  keV. In addition to the hard bremsstrahlung, neutrons amounting to  $\sim 10^5$  per pulse were also recorded. The heating is due to the discharge of an appreciable fraction of the energy of one of the injectors through the plasma along the magnetic field to the other injector, occurring when the electron velocity reaches a certain critical value. The plasma thus produced was contained in the magnetic mirror during the entire lifetime of the magnetic field, approximately 2 msec. "The authors thank A. I. Gorlanov who directly participated in the experiments." Orig. art. has: 4 figures.

ASSOCIATION: None

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L 14302-65

ACCESSION NR: AP4047934

SUBMITTED: 22Jul64

SUB CODE: ME

NR REF SOV: 005

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OTHER: 000

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